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The Impact of Tourism Development on Economic Growth in Sub-Saharan Africa

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Abstract

This study examines the dynamic impact of tourism development on economic growth in sub-Saharan Africa (SSA) using the Generalised Method of Moments and data covering the period from 2002 to 2018. The increasingly important role of tourism and the limelight the tourism sector has been enjoying of late, on the one hand, and the lack of sufficient coverage of tourism-growth nexus studies in Africa in general and in SSA in particular, motivated this study. Unlike most of the known panel data-based studies on tourism development and economic growth, this study has split the sub-Saharan African countries into low-income and middle-income sub-Saharan African countries. The results of the study show that tourism expenditure negatively affects economic growth while tourism receipts have the opposite effect in SSA. The findings are robust to the low-income sub-sample while only the effect of tourism expenditure is robust in the middle-income sub-sample.

Keywords: Tourism Development; Economic Growth; Sub-Saharan Africa, SSA, Middle Income Countries, Low Income Countries, Generalised Method of Moments, GMM

JEL Codes: O10, O40, Z3, Z32

1. Introduction

Tourism was commonly understood to be for the rich and affluent, who could afford engaging in tourism activities, until recently when it was discovered as a potential source of economic growth and poverty eradication in developing economies (World Travel & Tourism Council "WTTC", 2019; United Nations Conference on Trade and Development "UNCTAD", 2013). The discovery has made many governments to invest in the tourism sector. According to UNCTAD (2013), the importance of tourism in propelling economic growth and eradicating poverty emanates from its nature of involving diverse players. These range from governments – that shape the tourism sector and platform through the design of desired policy and regulatory interventions as well as infrastructure delivery – to private sector players. The latter include various large and small, and local and foreign business entities providing indigenous and exotic tourism supplies and services such as hotels, bed and breakfast outlets, restaurants, transport, local tour guides, and various other leisure and entertainment goods and services. The complex set up and arrangement of these tourism players creates linkages across all other sectors in the economy – thereby contributing to economic diversification and growth (UNCTAD, 2013). Through this complexity, small businesses also get to have a substantial share in tourism proceeds, creating an inclusive growth and sustainable economies. The potential for expansion of the tourism market, and the associated impact on economic growth, are especially high in Africa due to its abundance of natural assets, such as beaches, wildlife, cultural heritage, and adventure opportunities (Signe, 2018).

A number of studies have been carried out to validate this positive impact tourism has been said to have on economic growth (see, among others, Songling *et al.*, 2019; Sofronov, 2017; Bojanic and Lo, 2016; Pratt, 2015; Ma *et al.*, 2015; Holzner, 2011). However, of these studies, the majority are developing economies in Asia, leaving developing economies in Africa with little coverage. Only one known study (see Fayissa *et al.*, 2008) has made an attempt to empirically investigate the impact of tourism on economic growth in SSA – which is now a decade later. Much has since happened in terms of national policies, regional integration and international objectives towards pushing the economic growth agenda. The tourism sector has of late enjoyed the limelight as politicians and development economists have increased research to uncover the full potential of tourism in increasing economic growth and improving economic development across nations. A recent study on the impact of tourism on economic development in SSA can, therefore, not be overemphasised.

Against this backdrop, this study seeks to explore the dynamic impact of tourism development on economic growth in SSA during the period from 2002 to 2017, using dynamic panel data analysis. The study is fundamentally different from the existing studies in that it adds more than a decade to the period of analysis to that of Fayissa *et al.* (2008) that has an analysis period ending in 2004. The study also goes a step further by splitting the countries in SSA into two panels – low-income countries and middle-income countries – resulting in three panels altogether: first panel for low-income sub-Saharan African countries; the second panel for middle-income sub-Saharan African countries; and the third panel for all the sub-Saharan African countries in the study. This split allows for a probe into whether the impact of tourism on economic growth in SSA varies, depending on the countries' level of income. The rest of the paper is organised as follows: Section 2 provides a literature review, while section 3 discusses the methodology employed to examine the dynamic impact of tourism development on economic growth in SSA. Section 4 reports and analyses the results of the study while section 5 concludes the study.

2. Literature Review

In the recent past, the tourism sector has grown in importance as it became one of the world's largest and fastest growing sectors. According to United Nations Conference on Trade and Development "UNCTAD" (2013), the tourism sector contributed 5% to the global growth in 2011; and created about 7% of global employment in the same year.

With increasing globalisation and disposable income, even at the back of struggling global growth, tourism, according to the UNCTAD (2013) is promising to dominate the world as it unleashes its considerable potential for economic diversification, structural transformation and economic growth. By 2018, tourism sector's contribution to global growth had more than doubled its 2011 contribution, accounting for 10.4% of global growth while its contribution to global employment stood at 10% in the same year (World Travel & Tourism Council "WTTC", 2019).

Theoretically, tourism can positively impact on economic growth in two fronts – macro and micro fronts. From the macro perspective, tourism is a diversification agent, providing economic diversification as countries shift from primary industry based economic activities such as agriculture to services orientation such as export earnings (Signe, 2018). According to the World

Bank (2011) and Signe (2018), tourism contributes to economic growth and diversification much easier than other sectors such as manufacturing because of its low levels of input requirement, capital injections and overall expertise – hence in Africa, in general, and in SSA, where resources are scares, tourism is a desired economic stimulant.

With tourism also comes, great opportunities for small business development. The small and medium enterprises and organised community members partake in tourism activities – the result being increased employment and national aggregate output. In the process, women and the youth are absorbed into the industry (see World Bank, 2011). According to this report, in SSA women manage a majority of all hospitality businesses, with at least 80% of tourism establishments in Mali, Ethiopia and Lesotho managed by women. Hence the contribution of tourism to economic growth in SSA is not deniable, given that it is in SSA where women are significantly more likely to be poor and employed in the informal economy (World Bank, 2011; Asongu and Odhiambo, 2018).

From the micro and local level fronts, tourism translates to economic growth through its ability to improve income distribution, regional development, and employment opportunities for remote and low-skilled workers, with positive implications for both direct and indirect poverty levels and ultimate economic growth (see UNCTAD, 2013; Signe, 2018; WTTC, 2019).

With tourism promotion comes infrastructure development (Industrial Development Corporation "IDC", 2018), which will not only support the tourism industry but will end up supporting the economy at large. These advantages poised by tourism have made several governments in the sub-Saharan African region to put in place strategic plans to develop the tourism sector as an economic growth engine and a catalyst for development in the region at large and at country level. According to Signe (2018), countries such as Gambia, Kenya, South Africa and Tanzania are all putting significant efforts into further development of travel and tourism while Botswana, Mauritius, Rwanda, and South Africa are particularly increasing efforts to improve their business environment to attract tourism investment.

With the emergence of a stable and growing middle class on the African continent, partly due to increasing average income levels and job security, intra-African travel is also projected to theatrically increase over the next few decades (Signe, 2018; WTTC, 2019). The governments of Zimbabwe, Kenya and Ghana, among other developing states in SSA, have begun to provide

evidence in this regard by engaging in domestic travel promotion. Some of these countries have also begun to walk the talk as they embark on transport infrastructure development. With more than 10 million Africans already travelling across regional borders annually, South Africa dominates the inter-regional travel, as a preferred destination, with close to 50% of interregional visitors (Signe, 2018). To stay on top of the game, South Africa is among the countries that have further relaxed their restrictions on visa and permits to help facilitate freer movement of people so as to enhance the tourism sector and the associated benefits accrual.

Despite the established benefit of tourism in the growth process of economies, it does not come without its own challenges. According to the UNCTAD (2013), most poor countries that are reliant on tourism for development have a perpetual challenge of accounting for the greater share of financial resources injected into the local and international economy. In the event of a leakage – where a certain portion is not retained in the local economy – the multiplier effect is constrained, leading to a reduction in the sector's positive economic impact and development potential. Although the average leakage is estimated to be between 10% and 20% for developed and more diversified developing countries, it is much higher, at between 40% and 50% of gross tourism earnings for most developing countries (UNCTAD, 2013), which is the bulk of countries in SSA.

In addition, while tourism is valuable in several regards as it brings populations with different values, cultures, income levels and lifestyles in contact with each other, it is argued that it may lead to cultural degradation and disruption of communities in the destination country, and resentment and to some extent, ultimately rejection, of foreign tourists by local residents (United Nations Environment Programme "UNEP", 2011; UNCTAD, 2013). The latter creates disruptions, such as demonstrations and xenophobic attacks, with negative implications for tourist attraction and growth in an economy. Another negative and probably most pressing impact of tourism is on the environment as the sector is highly dependent on energy and water; tourism can cause considerable environmental and cultural heritage damage. Notwithstanding these shortfalls, tourism remains one of the growth engines in the world at large and in SSA in particular. Thus, although tourism comes with some challenges, its benefits tend to outweigh its pitfalls, thereby contributing positively to economic growth.

From an empirical front, tourism-growth subject appears to be under-studied as it is still a nascent area of interest for Development Economists and to poverty reduction and social

development advocates. However, of the available studies, most are done for developing economies in Asia, leaving only a handful covering developed economies and way fewer covering African economies in general and SSA in particular. Overall, results of these empirical studies on the tourism-growth impact nexus indicate that tourism development has a positive impact on economic growth, irrespective of the country or region of study, methodology used and the timeframe considered. What was found to vary from one study to another is the magnitude of impact of tourism on economic development. Table 1 is a summary of the empirical studies on the impact of tourism development on economic growth.

Table 1: Summary of the empirical studies supporting the positive impact of tourism on economic growth

Author(s)	**Study country/region**	**Data type**
Songling *et al.* (2019)	Beijing, China	Time-series
Bojanic and Lo (2016)	All countries that reporttourism and economic data	Panel
Pratt (2015)	Small Island Developing States	Panel
Ma *et al.* (2015)	China	Time-series
Holzner (2011)	134 countries	Panel
Jin (2011)	Hong Kong	Time-series
Fayissa*et al.* (2008)	Sub-Saharan Africa	Panel
Proenca and Soukiazis (2008)	Portugal	Time-series
Brau*et al.* (2007)	A sample of 143 countries	Panel
Cunado and Garcia (2006)	African region	Panel
Skerritt and Huybers (2005)	37 developing economies	Panel
Gunduz and Hatemi-J (2005)	Turkey	Time-series
Narayan (2004)	Fiji	Time-series
Dritsakis (2004)	Greece	
Brau*et al.* (2003)	14 'tourism countries' within a sample of 143 countries	Panel
Balaguer and Cantavella-Jorda (2002)	Spain	Time-series
Tosun (2000)	Developing countries	Panel

Despite the unanimous agreement among the reviewed studies that tourism development has a positive impact on economic growth, the spanner thrown-in by Chen and Devereux (1999) remains a significant force to reckon when dealing with the tourism-growth dynamics and impact in the African region. According to Chen and Devereux (1999), tourism may reduce welfare for trade regimes dominated by export taxes or import subsidies. The results of their study further revealed that although tourism is largely beneficial, tourist immiserisation is also possible in sub-Saharan Africa. Hence, the impact of tourism development, as proxied by tourist receipts, on economic growth in SSA cannot be predicted *a priori*.

3. Estimation Techniques

3.1 Model Specification

In order to empirically test the impact of tourism development on economic growth in the SSA, the empirical model is specified in functional form in Equation (1) and in linear form in Equation (2).

$$y = f(TE, TR, FD, DS, DI, TO, PS) \quad (1)$$

$$y_{it} = \alpha_0 + \alpha_1 TE_{it} + \alpha_2 TR_{it} + \alpha_3 FD_{it} + \alpha_4 DS_{it} + \alpha_5 DI_{it} + \alpha_6 TO_{it} + \alpha_7 PS_{it} + \varepsilon_{it} \quad (2)$$

Where **y**is economic growth; **TE** is tourism expenditure; **TR** is tourism receipt; **FD** is financial development; **DS** is the domestic savings; **DI** is domestic investment; **TO** is trade openness; **PS** is political stability; ε is the error term; $\alpha_0$is the constant; and α_{1-7} are the coefficients.

Following Equation (2), the associated panel data estimation model is specified as follow:

$$y_{it} = \alpha_{it} + \vartheta_i + \rho_t + \gamma(X_{it}) + \varepsilon_{it} \quad (3)$$

where, *y* is the dependent variable, economic growth proxied by per capita real gross domestic product (GDP) and is in logs; *X* is a vector of explanatory variables – TE, TR, FD, DS, DI, TO and PS; γ is a scalar vector of parameters $\alpha_1, \dots, \alpha_7$; ε is the disturbance term which follows *N* (0, σ^2); the subscripts "i" and "t" represent country and time, respectively, such that $t = 1, \dots, T; i = 1, \dots, N$ where T is the number of observations over time while N is the number of individual panel members; and ϑ_i and ρ_t are country and time specific effects, respectively.

For practicality purposes, it is assumed that some of the explanatory variables in the specified growth model are endogenous and that growth in the current period may be dependent on previous period values of the same variable. Following Arellano and Bond (1991) and Fayissa *et al.* (2007), a dynamic variant of the fixed and random effects provided in Equation (3) can be expressed as:

$$\Delta y_{it} = \alpha' \Delta y_{it-1} + \beta' \Delta X_{it-1} + \gamma' Z_{it} + \mu_i + \varepsilon_{it} \quad (4)$$

WhereΔy_{it} is the first difference of the per capitareal GDP– a proxy of the economic growth which is the dependent variable in country *i* during time *t;* $\Delta y_{it-1}$is lagged difference of the dependent variable, ΔX_{it-1} is a vector of lagged level and differenced predetermined and endogenous variables, $Z_{it}$is a vector of exogenous variables, and α, β, and γ are parameters to be estimated; μ_i are country specific effects which are independently and identically distributed over the countries; ε_{it} is a noise stochastic disturbance term that is assumed to be independently distributed; both$\mu_i$and $\varepsilon_{it}$are assumed to be independent over all time periods in country *i*.

To empirically examine the impact of tourism development on economic growth in SSA, the study utilised the generalised method of moments (GMM) estimation techniques as put forward by Arellano and Bond (1991) and Arellano and Bover (1995). This estimation technique was chosen because of its advantages over other panel data estimation methods. Among the available GMM options, this study employs the Roodman (2009) improvement of the difference GMM because it has been documented to provide more robust estimates compared to the less contemporary system GMM and difference GMM approaches (Boateng *et al.*, 2018; Asongu and Odhiambo, 2019a; Tchamyou *et al.*, 2019a, 2019b). Moreover, some elements of endogeneity are taken on board in the estimation exercise, notably: (i) the control for simultaneity or reverse causality with the use of internal instruments and (ii) accounting for the unobserved heterogeneity by means of time invariant fixed effects. The simultaneity approach to accounting for reverse causality as well as properties of identification and exclusion restrictions that are relevant for robust GMM specifications are discussed in the following section.

3.2 Identification, exclusion restrictions and simultaneity

For a sound GMM specification, properties surrounding the attendant identification, exclusion restrictions and simultaneity are worth articulating. The step of identification consists of articulating three categories of variables that are considered in the estimation exercise in the light of the problem statement, namely: (i) the outcomes variables, (ii) the suspected endogenous,

endogenous explaining or predetermined variables and (iii) the strictly exogenous variables. The outcome variable in the study is real GDP per capita growth; the endogenous explaining variables are tourism dynamics (i.e. tourism expenditure and tourism receipts) and elements involved in the conditioning information set (i.e. financial development, domestic savings, domestic investment, trade openness and political stability). The strictly exogenous variables are the years adopted for study. It is relevant to articulate that whereas it is difficult to find strictly exogenous variables, the choice of years is in accordance with attendant contemporary GMM-centric literature (Tchamyou and Asongu, 2017) and the argument by Roodman (2009) that years cannot be endogenous upon first difference. Hence, according to the narrative, years are strictly exogenous.

The notion of exclusion restriction consists of assessing if the identification process in the previous paragraph withstands empirical scrutiny. In other words, it consists of assessing if the identified strictly exogenous variables elucidate the outcome variables exclusively through the predetermined or endogenous explaining mechanisms consisting of the tourism channels and corresponding elements in the conditioning information set. The test used to assess if the underlying exclusion restriction assumption is valid is the Difference in Hansen (DHT) for instrument exogeneity. The null hypothesis of the attendant test is the position that the exclusion restriction assumption holds or withstands empirical scrutiny. It follows that in Section 4, the null hypothesis of the DHT should not be rejected in order for the identified strictly exogenous variables to influence the outcome variable exclusively via the main independent variables of interest and corresponding elements in the conditioning information. This narrative which is specific to the Roodman (2009) extension of Arellano and Bover (1995) is broadly consistent with less contemporary instrumental variable literature on the Sargan/Hansen test to be invalid in order for the considered instruments to explain the dependent variables exclusively to the identified endogenous explaining mechanisms (Lalountas *et al.*, 2011; Beck *et al.*, 2003; Agbloyor *et al.*, 2013; Amavilah *et al.*,2017).

On the front of simultaneity, the concern of reverse causality is taken on board with the employment of forward orthogonal deviations as opposed to first differences in a bid to facilitate orthogonal or parallel conditions that are essential in avoiding the correlation between the lagged dependent variable and country-specific effects, which is also a source of endogeneity. In essence, Helmert transformations are used to remove the fixed country-specific effects while at the same time controlling for simultaneity (Arellano and Bover, 1995; Roodman, 2009).

3.3 Data Description and Source

In this study, economic growth (y) is the dependent variable and is measured by GDP per capita. This proxy has been used widely in a number of studies seeking to establish the determinants of economic growth or to ascertain the relationship between economic growth and other macroeconomic variables. A lagged economic growth (y_{-1}) is included in Equation (4) as an explanatory variable, as in the standard Barro growth model.

The key explanatory variable in the model is tourism development dynamics which are proxied by tourism expenditure and tourism receipts in the light of the tourism development literature covered in Section 2. Theoretically, tourism development has a positive impact on economic growth through employment and income generation, stimulation of tourism sector and the sectors with linkages with the tourism sector – leading to generally increased economic activity in the economy (Ivanov and Webster, 2007). From the empirical front, there is also evidence that tourism development has a positive impact on economic growth (see Dritsakis, 2004; Durbarry, 2004; Akan *et al.*, 2007). Therefore, the coefficient of tourism development is expected to be contingent on whether the attendant tourism dynamics is a positive or negative macroeconomic signal. Hence, while tourism receipts are expected to positively influence economic growth, tourism expenditure should negatively affect economic growth. This is essentially because tourism receipts increase the potential national income to be distributed across the population, *ceteris paribus*, while tourism expenditure decreases the potential national income to be distributed across the population. The inference on the expected signs is informed by the notion that real GDP per capita is the quotient of that national income that is distributed across the population.

To minimise omission-of-variable bias, the study incorporates five control variables, namely: financial development (FD); domestic savings (DS); domestic investment (DI); trade openness (TO) and political stability (PS).

Financial development indicator shows the depth and breadth of financial sector development. Although it would have been ideal to have this approximated by both financial intermediaries and stock markets, most study countries had no sufficient stock market data – hence financial development in this study only focused on the extent of intermediation in the study countries; and is proxied by domestic credit to the private sector by banks as a percentage of GDP. Private bank credit to private sector is often claimed to be a more superior measure of financial

development (Ang and McKibbin, 2007).The premise of this argument is the ability of the private sector to utilise financial resources in a more efficient and productive manner as compared to the public sector. Hence the exclusion of credit to public sector is a reflection of efficient resource allocation (Ang and McKibbin, 2007). Higher ratio indicates that the financial sector is more developed and the more developed the economy is (see Beck *et al.*, 2007; Bayar, 2016), hence the coefficient of financial development is expected to be positive.

Savings in this study is proxied by the ratio of total domestic savings to GDP. The variable selection is largely influenced by its theoretical links to economic growth (see Solow, 1956; Romer, 1986). According to traditional theories, increasing savings translates to higher short-run growth during the transition between steady states (Solow (1956). Consistent with Solow's argument are the endogenous growth models developed by Romer (1986) and Lucas (1988), which show that a permanent increase in growth can be determined by higher savings and capital accumulation.

Another control variable utilised in this study is domestic investment, proxied by the ratio of gross fixed capital formation to GDP. Theoretical literature posits that domestic investment is good for economic growth. This assertion has also found support empirically (Abu-Bader and Abu-Qarn, 2008). According to Abu-Bader and Abu-Qarn, (2008), domestic investment is considered as one of the few economic variables that are robustly correlated with economic growth (see also Yartey, 2010; El-Nader and Alraimony, 2013). It is the expectation of this study that the coefficient of domestic investment is positive and statistically significant.

The relationship between trade openness and economic growth has been well explored over the years and there is overwhelming evidence pointing to the positive impact of trade openness on the economic growth process of an economy (see Ang and McKibbin, 2007). The more open the economy, the higher the economic growth (see also Pradhan *et al.*, 2008; Niroomand *et al.*, 2014). In this study, the degree of openness is found by summing up imports and exports as a percentage of GDP. The coefficient of trade openness is expected to be positive.

Political stability provides enabling conditions for the economic activity that is relevant to economic growth. Hence, the study expects political stability to positively influence economic growth.

The study empirically explores the impact of tourism development in 47 of the 48 sub-Saharan African countries, according to the World Bank (2019) classification. One country – Seychelles – was excluded as it was an outlier in that it was the only high income country in SSA.

Of the 47 countries, the study further split the countries into (24) low income sub-Saharan African countries and (23) middle income sub-Saharan African countries, where the latter combined lower- and upper-middle income countries in SSA.

As a result of this split, based on the World Bank country income grouping, the study consisted of three data panels – the first panel is for all the sub-Saharan African countries in the study, the second panel consists of low income countries and the third panel encompasses corresponding middle income countries. The motivation for these panels is to establish whether the impact of tourism development in SSA varies depending on a country's income level. As such, the empirical model specified for this study is run for each of the three panels. The inconsistence in data availability led to the adoption of unbalanced panel data analysis.

The study utilised annual time series data, covering the period from 2002 to 2018, obtained from the World Bank Data Bank, Economic Indicators Database (World Bank, 2019)and World Governance Indicators of the World Bank (World Bank, 2019)from which the political stability indicator is sourced. The motivation for choosing this time frame was based on the need to have a longer time period of analysis, which also coincided with availability of essential data.

In order to limit the proliferation of instruments and control for variable omission bias, data averages in terms of non-overlapping intervals are used in the estimation exercise. Accordingly, in GMM regressions the time dimension limits the potential number of control variables that can be involved in a regression exercise in order to avoid the proliferation of instruments, even when the option of collapsing instruments is involved in the estimation exercise (Asongu and Odhiambo, 2020; Asongu, 2019). Hence, using data averages enables this study to involve more control variables and limit potential concerns of instrument proliferation in post-estimation diagnostics tests. The periodicity of 17 years (i.e. 2002 to 2018) cannot be evenly divided by three. Therefore, for the adopted six data points pertaining to three year non-overlapping intervals, the first data point is a two year interval: 2002-2003, 2004-2006, 2007-2009, 2010-2012, 2013-2015 and 2016-2018. Appendix 1, Appendix 2 and Appendix 3 respectively disclose the definitions of variables and attendant sources, the summary statistics and corresponding correlation matrix.

4. Empirical results of the dynamic GMM estimation

This section discloses the empirical results which are presented in Tables 2 and 3. The findings, which are consistent with the Roodman extension of the GMM approach, are presented in the standard reporting style in the light of contemporary GMM-centric literature (Asongu and Odhiambo, 2020; Tchamyou, 2020). While Table 2 focuses on low income countries, Table 3 is concerned with middle income countries.

Table 2: Tourism Dynamics and Economic Growth (Low Income Countries)

	Dependent variable: Economic Growth (logGDP per capita)						
	Low Income Countries						**SSA**
GDP per capita (-1)	**0.570*** (0.000)**	**0.692*** (0.000)**	**0.696*** (0.000)**	**0.599*** (0.000)**	**0.711*** (0.000)**	**0.631*** (0.000)**	**0.968*** (0.000)**
Tourism Expenditure	0.003 (0.127)	0.001 (0.480)	**-0.005* (0.097)**	0.004 (0.103)	-0.004 (0.051)	-0.005 (0.417)	**-0.005** (0.022)**
Tourism Receipts	0.001 (0.545)	0.0002 (0.785)	0.002 (0.282)	**0.002*** (0.000)**	0.003 (0.138)	**0.002** (0.011)**	**0.002*** (0.000)**
Financial Development	---	**0.005* (0.078)**	---	---	---	---	-0.0009 (0.260)
Domestic Savings	---	---	**0.0009*** (0.001)**	---	---	---	**0.002*** (0.001)**
Domestic Investment	---	---	---	**0.002** (0.011)**	---	---	**0.002** (0.023)**
Trade Openness	---	---	---	---	0.00002 (0.932)	---	**0.0007* (0.057)**
Political Stability	---	---	---	---	---	**0.048** (0.031)**	**0.048*** (0.001)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	**[0.501]**	**[0.120]**	**[0.345]**	**[0.257]**	**[0.306]**	**[0.233]**	[0.068]*
AR(2)	**[0.944]**	**[0.263]**	**[0.990]**	**[0.424]**	**[0.879]**	**[0.576]**	**[0.526]**
Sargan OIR	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	**[0.478]**	[0.000]***
Hansen OIR	**[0.386]**	**[0.132]**	**[0.352]**	**[0.221]**	**[0.280]**	**[0.612]**	**[0.382]**
DHT for instruments							
(a)Instruments in levels							
H excluding group	---	[0.012]**	[0.081]*	[0.076]*	[0.023]**	[0.055]*	**[0.603]**
Dif(null, H=exogenous)	**[0.669]**	**[0.519]**	**[0.559]**	**[0.377]**	**[0.709]**	**[0.916]**	**[0.283]**
(b) IV (years, eq(diff))							
H excluding group	[0.023]**	[0.055]*	**[0.181]**	**[0.153]**	**[0.281]**	**[0.311]**	**[0.297]**
Dif(null, H=exogenous)	**[0.999]**	**[0.526]**	**[0.620]**	**[0.409]**	**[0.316]**	**[0.820]**	**[0.595]**
Fisher	**93.66*** **	**742.90*** **	**503.61*** **	**106541.44*** **	**367.45*** **	**259.22*** **	**254553.25*** **
Instruments	15	19	19	19	19	19	35
Countries	20	20	20	20	20	19	39
Observations	90	87	88	90	88	85	177

Note:

1) ***,**,*: significance levels at 1%, 5% and 10% respectively.
2) The numbers in parentheses represent p-values.
3) DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets.
4) Dif: Difference.
5) OIR: Over-identifying Restrictions Test.
6) The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests.
7) Constants are included in all regressions.
8) GDP: Gross Domestic Product. SSA: Sub-Saharan Africa.
9) ( ) for p-values of estimated coefficients and [ ] for p-values of all other tests with the exception of the Fisher test.

Table 3: Tourism Dynamics and Economic Growth (Middle Income Countries)

	Dependent variable: Economic Growth (logGDP per capita)						
	Middle Income Countries						**SSA**
GDP per capita (-1)	**1.011*** **	**0.869*** **	**0.967*** **	**1.020*** **	**0.947*** **	**0.898*** **	**0.968*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Tourism Expenditure	-0.0002	**-0.009** **	-0.0001	**0.010*** **	-0.002	0.004	**-0.005** **
	(0.962)	**(0.010)**	(0.964)	**(0.001)**	(0.467)	(0.425)	**(0.022)**
Tourism Receipts	0.0003	-0.0004	-0.0001	-0.0004	-0.0002	-0.001	**0.002*** **
	(0.404)	(0.291)	(0.815)	(0.755)	(0.752)	(0.364)	**(0.000)**
Financial Development	---	**0.002*** **	---	---	---	---	-0.0009
		(0.003)					(0.260)
Domestic Savings	---	---	0.001	---	---	---	**0.002*** **
			(0.323)				**(0.001)**
Domestic Investment	---	---	---	**0.005*** **	---	---	**0.002** **
				(0.002)			**(0.023)**
Trade Openness	---	---	---	---	**0.001***	---	**0.0007***
					(0.066)		**(0.057)**
Political Stability	---	---	---	---	---	**0.103*** **	**0.048*** **
						(0.004)	**(0.001)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	**[0.180]**	**[0.172]**	**[0.189]**	**[0.116]**	**[0.222]**	**[0.146]**	[0.068]*
AR(2)	**[0.295]**	**[0.112]**	**[0.330]**	**[0.690]**	**[0.176]**	**[0.438]**	**[0.526]**
Sargan OIR	[0.000]***	[0.000]***	[0.001]***	[0.003]***	[0.003]***	[0.014]**	[0.000]***
Hansen OIR	[0.023]**	**[0.271]**	[0.034]**	[0.033]**	**[0.214]**	**[0.288]**	**[0.382]**
DHT for instruments							
(a)Instruments in levels							
H excluding group	---	[0.049]**	**[0.161]**	[0.040]**	**[0.107]**	**[0.121]**	**[0.603]**
Dif(null, H=exogenous)	[0.033]**	**[0.536]**	[0.041]**	[0.084]*	**[0.316]**	**[0.401]**	**[0.283]**
(b) IV (years, eq(diff))							
H excluding group	**[0.252]**	**[0.166]**	[0.043]**	[0.085]*	**[0.163]**	**[0.149]**	**[0.297]**
Dif(null, H=exogenous)	[0.020]**	**[0.489]**	**[0.147]**	[0.072]*	**[0.372]**	**[0.572]**	**[0.595]**
Fisher	**457.13*** **	**639.69*** **	**909070.47* ** **	**2689.76*** **	**347.59*** **	**199308.10* ** **	**254553.25* ** **
Instruments	15	19	19	19	19	19	35
Countries	22	22	21	21	21	22	39
Observations	106	106	97	97	100	106	177

Note:

1) ***,**,*: significance levels at 1%, 5% and 10% respectively.
2) The numbers in parentheses represent p-values.
3) DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets.
4) Dif: Difference.
5) OIR: Over-identifying Restrictions Test.
6) The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests.
7) Constants are included in all regressions.
8) GDP: Gross Domestic Product. SSA: Sub-Saharan Africa.
9) ( ) for p-values of estimated coefficients and [ ] for p-values of all other tests with the exception of the Fisher test.

In both tables, the last columns present the findings of the SSA sampled in order to facilitate horizontal comparison. The sub-sample specifications (i.e. low income and middle income countries) are tailored such that not all the adopted elements in the conditioning information set are employed in the specification in order to avoid concerns of valid models in the post-estimation diagnostics even when the option of collapsing instruments is incorporated. For instance, it is apparent from the second specification or third column of Table 3 that when one element of the conditioning information set is taken on board, the number of countries is just higher than the corresponding number of instruments by one degree of freedom in order to limit instrument proliferation. This implies that if another control variable was taken on board, the number of instruments would have been higher than the corresponding number of countries in the post-estimation diagnostics which invalidates the specification.

It is worthwhile to note that only one element in the conditioning information set is adopted for sub-sampling estimations because in GMM modelling, there is a choice between: (i) limiting concerns of variable omission bias as much as possible and (ii) having robustly estimated specifications that pass the post-estimation diagnostic test related to instrument proliferation (Tchamyou, 2019, 2020). "*Our justification for employing two control variables in the GMM specification is very solid, because employing more than two variables will lead to findings that do not pass all post-estimation diagnostic tests owing to instrument proliferation, even when the option of collapsing instruments is taken on board in the estimation exercise. There is a choice here between having valid estimated models and avoiding variable omission bias*" (Asongu and Odhiambo, 2019b, p. 7). In essence, in the attendant GMM-centric literature, in order to have estimations that are valid because they are robust to the avoidance of instruments proliferation, at the expense of variable omission bias, some studies have used no control variable (Osabuohien and Efobi, 2013; Asongu and Nwachukwu, 2017) or as few as two control variables (Bruno *et al.*, 2012).

In order to examine if the findings disclosed in Tables 2-3 are valid, the study uses four principal information criteria in accordance with attendant GMM-centric literature[2]. In the light of these

[2] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR (2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second the Sargan and Hansen over-identification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for exogeneity of instruments is also employed to assess the validity of results from the Hansen OIR test. Fourth, a Fisher test for the joint validity of estimated coefficients is also provided*" (Asongu and De Moor, 2017, p.200).

information criteria, all the models in Table 2 are valid while for Table 3, the first (i.e. second column), third (i.e. fourth column) and fourth (i.e. fifth column) specifications are not valid because they do not pass the post-estimation diagnostic test pertaining the Hansen test versus Sargan test. Accordingly, while the Sargan test is not robust but not weakened by instrument proliferation, the Hansen test is robust but weakened by instrument proliferation. Hence, the rule of thumb is to prioritise the Hansen test and avoid instrument proliferation by ensuring that the number of instruments in each specification is less than the corresponding number of countries. It is also worthwhile to note that a robust approach is a *two-step* process that accounts for heteroscedasticity while an approach that is not robust is a *one step* process that takes only the concern of homoscedasticity on board.

In the light of the above clarifications on the information criteria pertaining to the estimated models, a number of findings can be established from Tables 2 and 3. By and large, the impact of tourism development on economic growth has been found to vary across panels, depending on the measure of tourism development under consideration. Tourism expenditure negatively affects economic growth while tourism receipts have the opposite effect in the full sample. These results are consistent with theory as well as empirical evidence on the tourism development and economic growth nexus (see Fayissa *et al.*, 2008; UNCTAD, 2013; Bojanic and Lo, 2016; Sofronov, 2017; Signe, 2018; WTTC, 2019; Songling *et al.*, 2019). The findings on the effects of tourism dynamics are robust in the low income sub-sample in terms of significance and magnitude of significance. However, in the middle income sub-sample, tourism expenditure negatively affects economic growth while there is no significant effect from the impact of tourism receipt.

A number of factors can be attributed to the varying degree of tourism development effectiveness in propelling the real sector in SSA countries with varying income levels (Signe, 2018). As the country becomes more developed, it moves towards a more diversified economy – with significant movement from primary sector and community related economic activities to secondary and tertiary sector related as well as commercial related economic activities. Such movements render the impact of tourism on economic growth in middle income countries to seem insignificant; while every effort to promote tourism goes a long way in developing backward communities in low income countries engaging in tourism activities (Signe, 2018).

The results of the difference GMM estimation also show that economic growth in the previous period has a significant positive impact on the current period economic growth, irrespective of the panel under consideration.

Most of the significant control variables have the expected signs in both tables. As expected, financial development was found to have a positive impact on economic growth in both low and middle income sub-Saharan African countries but on for the overall SSA sample. Although results for the third panel are contrary to expectations, they are not unusual (see, among others, Adu *et al.*, 2013; Nyasha and Odhiambo, 2016). Also consistent with expectations, domestic savings and domestic investment were found to have a positive impact on economic growth - across all three panels for the latter but only for the first and third panels for the former. The coefficient of trade openness was not consistent across all panels – it was positive and statistically significant for middle-income sub-Saharan African countries and for the whole SSA while insignificant for the low-income sub-Saharan African countries. Political stability was found to positively affect economic growth consistently across all the panels.

5. Conclusion

In this paper, the dynamic impact of tourism development on economic growth in SSA has been empirically examined using GMM estimation techniques and data covering the period from 2002 to 2018. The study was motivated by the increasingly important role of tourism and the limelight the tourism sector has been enjoying of late, on the one hand, and the lack of sufficient coverage of tourism-growth nexus studies in Africa in general and in SSA in particular.

Unlike most of the known panel data based studies on tourism development and economic growth, this study has split sub-Saharan African study countries into low-income and middle-income sub-Saharan African countries – thereby giving rise to three panels: the first panel, with analysis based on low-income sub-Saharan African study countries; the second panel, with analysis based on middle-income sub-Saharan African study countries; and the third panel, with analysis based on all sub-Saharan African study countries. These panels allowed the study to examine whether the impact of tourism development on economic growth in SSA is dependent on the countries' income level – an aspect which is crucial for policy proposals since SSA is made up of countries at different income levels.

The results of the study revealed that the impact of tourism development on economic growth is not obvious. By and large, it has been found to vary across panels, depending on the measure of tourism development under consideration. Tourism expenditure was found to negatively affect economic growth while tourism receipts were found to have the opposite effect in the full sample. While these finds were robust in the low income sub-sample in terms of significance and magnitude of significance; in the middle income sub-sample, tourism expenditure was found to negatively affect economic growth while tourism receipts were insignificant.

A number of factors can be attributed to the varying degree of tourism development effectiveness in propelling the real sector in SSA countries with varying income levels (Signe, 2018). As the country becomes more developed, it moves towards a more diversified economy – with significant movement from primary sector and community related economic activities to secondary and tertiary sector related as well as commercial related economic activities. Such movements render the impact of tourism on economic growth in middle income countries to seem insignificant; while every effort to promote tourism goes a long way in developing backward communities in low income countries engaging in tourism activities (Signe, 2018).

Based on the results of the study, responsible authorities in SSA are recommended to strengthen national tourism policies and the implementation thereof. Tourism infrastructure development is also recommended as it has a two-pronged effect on the real sector. First, it develops the tourism sector, and second, it also contributes to the development of other sectors such as transport and other economic sectors. As the tourism sectors develop, the sub-Saharan African economies are also bound to grow – with countries with lower national income growing faster.

6. Conflict of Interest

No conflict of interest.

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Appendices

Appendix 1: Definitions of Variables

Variables	Signs	Definitions of variables (Measurements)	Sources
GDP per capita	GDPpc	Logarithm of GDP per capita (constant 2010 US$)	WDI
Tourism Expenditure	Tourism E.	International tourism, expenditures (% of total imports)	WDI
Tourism Receipts	Tourism R.	International tourism, receipts (% of total exports)	WDI
Financial Development	Finance D.	Domestic credit to private sector by banks (% of GDP)	WDI
Domestic Savings	Domestic S.	Gross domestic savings (% of GDP)	WDI
Domestic Investment	Domestic I.	Gross capital formation (% of GDP)	WDI
Trade Openness	Trade	Imports plus Exports of goods and services (% of GDP)	WDI
Political Stability	Political St.	"*Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional and violent means, including domestic violence and terrorism*"	WGI

WDI: World Bank Development Indicators of the World Bank. WGI: World Governance Indicators of the World Bank.

Appendix 2: Summary statistics

	Mean	SD	Minimum	Maximum	Observations
GDP per capita (log)	7.045	1.003	5.297	9.879	271
Tourism Expenditure	6.107	4.124	0.118	21.123	233
Tourism Receipts	13.801	15.066	0.102	72.087	229
Financial Development	18.269	16.979	0.599	102.556	266
Domestic Savings	12.027	22.056	-199.832	-119.832	256
Domestic Investment	22.112	9.296	0.000	56.138	257
Trade Openness	72.219	33.452	20.762	279.333	261
Political Stability	-0.562	0.903	-3.273	1.064	273

S.D: Standard Deviation.

Appendix 3: Correlation matrix (uniform sample: 202)

	GDPpc	Tourism E.	Tourism R.	Finance D.	Domestic S.	Domestic I.	Trade	Political St.
GDPpc	1.000							
Tourism E.	0.080	1.000						
Tourism R.	0.034	0.315	1.000					
Finance D.	0.601	-0.050	0.316	1.000				
Domestic S.	0.454	-0.001	-0.220	0.096	1.000			
Domestic I.	0.178	-0.167	0.020	0.189	0.334	1.000		
Trade	0.321	-0.241	-0.120	0.211	-0.172	0.270	1.000	
Political St.	0.377	0.054	0.338	0.431	0.080	0.172	0.226	1.000

GDPpc: logarithm of GDP per capita. Tourism E: Tourism Expenditure. Tourism R: Tourism Receipt. Finance D: Financial Development. Domestic S: Domestic Savings. Domestic I: Domestic Investment. Trade: Trade Openness. Political St: Political Stability.